

FEATURING—NEWS LETTERS

The Biologist



Vol. XXIII, No. 2

December, 1941

Phi Sigma

BIOLOGICAL HONOR SOCIETY

"The object of Phi Sigma is to promote interest in biological research. Although originally designated as an honorary biological research society, it should now be considered as a working guild of biologists interested in research. In effect, election to Phi Sigma should be an opportunity for better work, rather than merely election to an honorary society."

Mile Posts:

- 1915 March 17, Alpha Chapter organized, Ohio State University, Columbus.
- 1916 May, Central Governing Body organized, BIOLOGIST first issued.
- 1917 June, last War-time BIOLOGIST issued.
- 1921 February, BIOLOGIST revived.
- 1924 December, First National Meeting, Constitution revised, Washington, D. C.
- 1925 December, Second National Meeting, First Science Program, Kansas City.
- 1926 December, Third National Meeting, Second Science Program, Philadelphia.
- 1927 December, Third Science Program, Nashville.
- 1928 December, Fourth National Meeting, Coat-of-Arms adopted, Fourth Science Program, New York.
- 1930 January, Council Meeting, Ritual Revised, Norman, Okla.
December, Fifth National Meeting, Fifth Science Program, Cleveland.
- 1931 Phi Sigma Letters Registered, U. S. Patent Office.
- 1932 December, Sixth Science Program, Atlantic City.
- 1933 June, Sixth National Meeting, Seventh Science Program, Chicago.
- 1935 December, Seventh National Meeting, Eighth Science Program, St. Louis.
- 1937 December, Eighth National Meeting, Ninth Science Program, Indianapolis.
- 1939 December, Ninth National Meeting, Tenth Science Program, Silver Anniversary, Ohio State University, Columbus.

Expansion:

The Constitution provides that: "An active chapter may be established in any institution of learning which requires for graduation the equivalent of four years of collegiate work, and which is equipped with facilities for research work. - - - Any petitioning group must be active for at least one year before it may be granted a charter."

THE BIOLOGIST

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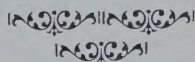
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OF ALL ACTIVE AND INACTIVE CHAPTERS

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CHAPTER NEWS section of Vol. XXIII, No. 2*

ALPHA

Ohio State University, Columbus, Ohio, founded March 17, 1915, (Inactive).

BETA

University of Michigan, Ann Arbor, Michigan, founded June 3, 1916

DELTA

University of Maine, Orono, Maine, founded January 27, 1917, (Inactive).

EPSILON

University of Denver, Denver, Colorado, founded March 5, 1917.

ZETA

University of Wisconsin, Madison, Wisconsin, founded May 30, 1917

ETA

University of Akron, Akron, Ohio, founded April 20, 1921.

THETA

Michigan State College, East Lansing, Michigan, founded April 9, 1921, (Inactive).

IOTA

Washington University, St. Louis, Missouri, founded May 28, 1921.

KAPPA

University of Kansas, Lawrence, Kansas, founded May 31, 1921.

LAMBDA

Montana State University, Missoula, Montana, founded May 4, 1921.

MU

University of California, Berkeley, California, founded April 27, 1922.

NU

Washington and Jefferson College, Washington, Pennsylvania, founded May 11, 1922

XI

University of Nebraska, Lincoln, Nebraska, founded May 3, 1934, (Inactive).

OMICRON

University of North Dakota, Grand Forks, North Dakota,
founded May 26, 1924, (Inactive).

PI

Emory University, Georgia, founded January 3, 1925.

RHO

University of Illinois, Urbana, Illinois, founded March 28, 1925.

SIGMA

University of Florida, Gainesville, Florida, founded December 4, 1925.

TAU

Duke University, Durham, North Carolina, founded March 4, 1926.

UPSILON

Miami University, Oxford, Ohio, founded May 7, 1926.

PHI

University of New Hampshire, Durham, New Hampshire, founded May 21, 1926.

CHI

Montana State College, Bozeman, Montana, founded February 11, 1927.

PSI

University of Washington, Seattle, Washington, founded April 7, 1928.

OMEGA

University of Oklahoma, Norman, Oklahoma, founded March 24, 1928.

ALPHA ALPHA

University of Southern California, Los Angeles, California, founded May 17, 1930.

ALPHA BETA

Mount Union College, Alliance, Ohio, founded May 17, 1928.

ALPHA GAMMA

University of South Dakota, Vermillion, South Dakota, founded May 15, 1928, (Inactive)

ALPHA DELTA

Lawrence College, Appleton, Wisconsin, founded March 7, 1929, (Inactive).

ALPHA EPSILON

University of Pittsburgh, Pittsburgh, Pennsylvania, founded March 23, 1929.

ALPHA ZETA

College of William and Mary, Williamsburg, Virginia, founded April 19, 1930, (Inactive).

ALPHA ETA

Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma,
founded March 13, 1930.

ALPHA THETA

State College of Washington, Pullman, Washington, founded May, 1930.

ALPHA IOTA

Bucknell University, Lewisburg, Pennsylvania, founded January 9, 1932.

ALPHA KAPPA

Hunter College, New York City, founded January 8, 1932.

ALPHA LAMBDA

University of Utah, Salt Lake City, Utah, founded February 13, 1932.

ALPHA MU

University and State College of Oregon, Eugene-Portland-Corvallis, Oregon,
founded November 18, 1933.

ALPHA NU

University of New Mexico, Albuquerque, New Mexico, founded April 21, 1935.

ALPHA XI

Rhode Island State College, Kingston, Rhode Island, founded May 17, 1935.

ALPHA OMICRON

Marquette University, Milwaukee, Wisconsin, founded June 18, 1938.

ALPHA PI

University of Colorado, Boulder, Colorado, founded May 24, 1941.

An After-dinner Speech

DR. CHARLES H. SKINNER

(before the Alpha Omicron Chapter, May 4, 1941)

I accepted the invitation to say a few words on this occasion without the slightest notion of what I was getting into, and when I finally realized the significance and grandeur of the occasion, I was for getting sick or being called out of town or something. But Dr. McDonough assured me that my membership in the Northern Nut Growers Association fully qualified me as your after-dinner speaker. And, anyway, he assured me, no one ever expected an after-dinner speaker to say anything important. He told me that a good after-dinner speech was one calculated to thoroughly bore the audience in at least 30 minutes, but he was sure I could do it in 20.

Your presentation to Dr. Steil of a life-membership in the Society of Ferns is a timely and gracious ovation. It is particularly gratifying to see you classify him with the ferns rather than the mosses. I would like to congratulate Dr. Steil for having earned this distinction. Not many teachers are honored as highly by their own students as you have honored him. He should rejoice to know that he has realized one of the greatest ambitions of the true teacher and counsellor,—the love and respect of his own students. There are many teachers who would like to know his secret. Maybe the most of us who fail, do so because we have substituted less worthy ambitions, and have spent our energies and dulled our senses while striving towards their realization. Be that as it may, for myself, at least, I am beginning to realize one of the les-

ser ambitions, but a life-time ambition at that. And I am enjoying it so thoroughly that I would like to share it with you for a few minutes.

For years I had hoped to own a small farm, partly rolling, partly level, with a clear crystal stream winding its way through woods and fields, with the low fields rich in alluvial and decayed vegetable matter, and with the hills deep in pasture where contented cattle might graze, and lie down, and graze again. I had in mind a place that in time might even surpass the Garden of Eden, where there would be not only a sanctuary for wild things, both plants and animals, but also a place where horticulture and agriculture would thrive, and where one could work—would have to work—from the pure excitement of being alive.

Happily, my wife cherished ambitions similar to mine, but not until five or six years ago did we find a farm whose magic gripped us and whose spell couldn't be broken. It is located in Boone County, Indiana, right near the hub of the universe. We have made many field-trips to this location, where we spend all of our vacations and most of our savings.

There are 70 acres in this farm. The deed says "70 acres, more or less," but I can assure you there's a heap more than just 70 acres in our bit of country terrain. About half of it is in woods and creek and permanent pasture, and the other half in weeds most of the time. We were able to buy it for a song, though neither of us sing. Every

year since, however, it has taken both a song and dance to pay the tax-collector his tribute.

We subscribe to a few farm magazines; I think seven is the exact number. The first magazine on our list is *Country Gentlemen*. It is really a good farm paper; but even if it weren't worth the printer's ink, I would still take it because I like the title.

I must tell you about our nearest neighbors, the Wilsons. They are an elderly couple living alone, each well past 70. Browning had *them* in mind when he wrote "Grow old along with me, . . ." They are both typical farmers, with their roots in the soil, seasoned with the seasons and anchored with the years. Their home lies east of ours a quarter of a mile. To get from one to the other means a lot of rough walking, up and down hill, along steep slopes, climbing three fences in the meantime. But hardly a day passes during any of our visits to the farm that one or the other of them doesn't do some kindness for us. Sometimes I am amazed at the seemingly endless number of nice things they think of. I've told some of you this incident, but it's worth repeating. It happened two years ago on the last day of our summer's vacation. On the day before, we had returned the cow we had borrowed for the summer, and we were all ready to start back to Milwaukee early the next morning, when that night about nine o'clock we heard a knock at the back door. It was Mrs. Wilson. She had brought us a quart of milk so we could have cream for our coffee in the morning!

Now Mr. Wilson, like the true farmer that he is, works long hours, sometimes anxious to save his harvest, but rarely do you see him rushing pell-mell just to get a task over. He goes about his work as if he loved it, rather

than tearing into a job in order to finish it up and make good his escape. He has learned to find real pleasure in whatever he undertakes. To him, the greatest possible joy gotten from any task, whether it be play or work, is gotten not from the task accomplished but from the doing of it and from the memories associated with the doing. Perhaps that's why both of them do so many thoughtful things.

As I speak to a biology group like this, I feel I am speaking to country folks, at least at heart. You may live in the city, but it is largely a matter of chance, or maybe circumstance, rather than choice. I live in the city too, about $\frac{3}{4}$ of the year; have been for thirty years; but I was born in the country, reared in the country, and I think I understand country folks and country-loving folks far better than the guy who wrote "R. F. D."

Nothing would give me greater pleasure than to be out on the farm now, with this entire group which is assembled here, so that I might actually conduct you on a field-trip from the house, past the garden, down the hill between the spring and nursery row, across the little foot-bridge over the tiny spring rivulet, and into an OLD lane which leads to the creek, a small stream just right to wade unless there has been a "goose-drownder" the night before, and then on up a gently rising slope to a young orchard beyond. I would show you a thousand things which have become dear to us. But since all *that* is impossible just now, will you come with me in your imagination?

As we step out of the kitchen door and turn north, some of you stop to pump a drink of water, looking up at me as if to ask, "Is it safe?" Yes, it is perfectly safe. When we acquired this place, there was no pump here, not

even a well. The first thing we did that first summer was to hire a well-drilling outfit. For weeks they hammered away, sinking a 4-inch pipe in search of water. After going down nearly 200 feet, water came gushing up to the top of the hill. It was a flowing well of pure crystal water. You may *pump* a drink now, or walk a few steps to where the water is flowing out pure and cold on the side of the hill.

Here on our right is our small garden, handy to the kitchen. Our main garden is a little farther over, on the sunny slope of that hill just beyond the ravine. We have lots of fun in our gardens. I recall two years ago when we were on our annual Easter field-trip, Mrs. Wilson gave us a mess of parsnips. I picked out the nicest one and laid it aside to plant. Incidentally, we aren't especially fond of parsnips, and the remainder of the mess soon found its way to that compost heap you see just beyond the garden fence. You know, parsnips are biennial. You eat them (or do you?) the first year, and plant them for seed the second. I planted this one behind those prickly gooseberry bushes you see along the fence, a safe place if there ever was one. I was enthusiastic over the anticipation of gathering a hat-full of seeds the following fall. Just what I'd do with that many parsnip seeds hadn't disturbed me. By the middle of the summer, this parsnip had developed a strong seed stalk, when one day I missed it. A little detective work revealed that my wife had pulled it up with a lot of other weeds, such as catnip and vermifuge, and dumped the whole caboodle onto the compost heap, where the parsnip finally joined its fellows. Well, after all, what's the difference? One can buy a lot of parsnip seeds for a nickel, if one wants them.

Right in this connection, I'd like to contribute a couple cent's worth

of personal opinion on the subject of "raising vs. buying seeds." When one buys a packet of seeds, he gets only a packet of seeds; but when he raises a packet, he has not only the seeds but something else which is elusive in description.

Regardless of how much or how little one knows about morphology, or gametophytes and sporophytes, or histology, cytology, mycology, or taxonomy,—they are all hundred-dollar words to me, picked up while reading the graduate school bulletin,—regardless, I say, of how much or little one knows about all these things, some of the finest sensations to be experienced when dealing with plants and animals is in connection with actual propagation. The sheer joy of raising a seed plant to maturity, and saving the seeds, is experienced by only a handful of individuals, now-a-days, and they are found mostly among professionals who raise seeds for a living.

A half-a-hundred years ago, every country dweller was a plant specialist, a plant breeder after a fashion, but certainly a plant propagator. He or she had a vast knowledge of plants, if not scientifically accurate, at least fundamentally important from an economic standpoint. Collectively, they were a generation of plant propagators, who grew plants to maturity, garnered the seeds, preserved, and planted again. Carrying seed plants through their life cycles year after year was not only a necessary procedure in the task of self-preservation, but a labor of love. Now, seeds are bought ready made, put up in neatly labeled packages like pills and vitamins. With this tendency towards specialization, not only in raising fine seeds but in developing new varieties, the saving of seeds by the present day gardener is relatively unimportant economically. However, it

seems to me that when we let the seed specialists take over and practically corner some of the richest experiences of the human race, we are letting something like fine gold go out of our lives.

Incidentally, Wisconsin is one of the greatest cabbage-growing states of the Union, and it would be interesting though embarrassing if we were to ask even this group how many of you have ever seen a cabbage going to seed.

If that's a good two-cents worth, let's proceed with the field trip.

This big apple-tree you see at the lower end of the garden is perhaps older than the oldest inhabitant in these parts. It may be nearing the century mark. It is a winesap. Johnny Appleseed had nothing to do with it, for though the origin of the winesap is unknown, it dates well back into the Colonial period. This particular tree will soon have raised its last brood of coddling moths and flat-headed borers. You can see the dead wood creeping into its very heart now. Only six weeks ago I cut out three of its huge scaffold limbs, each nearly a foot in diameter. All three were dead, but I reluctantly cut one of them. Several years ago, a red-headed wood-pecker had carved out a nest high up in this particular limb. It seems that the red-heads had raised a couple families there, when it was taken over by the blue-birds. By the time we came, it had passed into the possession of a pair of yellow-hammers (you may know them as flickers), who used it until two years ago, when it was finally abandoned as unsafe for a home for little birds. So, it was with a little twinge of regret that I laid-to with the ax. I found it a rather difficult and precarious task, straddled out between two limbs several feet above the ground. After an hour of my hacking away, the limb started to move, slowly at first, and then with a crash it hit

the ground and split wide open where the birds had nested so many years. Imagine my utter astonishment when a little screech-owl, who was caught napping, floundered out and flew into our hay-mow.

No, we haven't any bees. That's just an empty hive you see there.

It was late last summer, about four o'clock one hot afternoon. I was across the creek in the berry orchard surveying the havoc that crown-gall was wreaking on our black raspberries, when Charles Jr. came running up, saying that a swarm of bees had settled on a low limb of a sycamore tree, on the Wilson farm. Mrs. Wilson had discovered the bees as she was on her way over to our house. She said we could have them, but at that time we had no bee-gums and no experience in hiving bees. However, we snapped into action, rushing into an experience that more sober thought would have let pass quietly into the night. The boys, Charles Jr. and Frank, hastened to town and bought a knocked-down hive for \$4.80. For an hour and a half we labored furiously getting it assembled. Next came the job of transferring the bees from the sycamore to the hive. This was done by cutting off the limb on which the bees had settled, and shaking them into the hive. But they had got restless, hanging so long, with the thermometer at 98° in the shade. The swarm, to begin with, was a good sized one, a gallon or so of solid bees, but by the time the hiving operation was over we had lost nearly half of them. An experienced bee-man would have saved every one. However, the next morning when we got up, the bees which we did save were already hard at work among the hollyhocks.

By the first of September, when we had to leave for Milwaukee, we were

getting quite bee-minded with visions of a great apiary yielding tons of honey each year. When we returned for our Thanksgiving vacation, the flowers were gone, the ground was frozen, and the bees had ceased their outdoor activity for the long winter ahead. The old hollyhocks, stark though vivid reminders of a glorious summer, still stood like silent sentries about the hive. Placing our ears very gently against the hive, we could hear the bees softly humming, like a great orchestra tuning up before the symphony.

The rest of the story is rather tragic. The hive had not had time to raise new bees before the cold weather came, and owing to its decimated numbers was unable to keep up the necessary hive temperature without over-eating. Neither had it had time to ripen the honey which was gathered during the shortening days of late summer and early fall. Dysentery followed, and the final curtain. All that is left to remind us of one of our most thrilling experiences is this empty bee-gum here by the garden fence.

Now, here's the spring, or really our flowing well, where you may drink informally if you like, and just to our left is our nursery row. Here we place shrubs and trees temporarily, later to be placed in permanent locations. There are several now waiting to be transplanted, and every one of them has a personal history. Take this little apple tree, for instance. Soon we shall plant it into its permanent location. Maybe it isn't worth transplanting, for it's only a seedling, but we're hoping. The history of this tree goes back a little over four years. I was in St. Joseph's Hospital, making life miserable for the nurses, when one day my wife brought me a delicious apple. I ate it, all but the seeds, and I asked her to plant them in our garden in the

city. This tree grew from one of these seeds, and we have named it the St. Joe apple. We will know in a few years whether it turns out to be entirely valueless, or not. But if it should prove of outstanding value, it will take 50 years to establish the fact.

Now, let's cross over the foot-bridge and walk down the hill into the lane. I've already told you it is an *old* lane, which means that it is an enchanted one. A new lane is rarely enchanted. In the course of time, however, seeds of the lynn, ash and sugar tree blown by the wind; of the honey locust left by the cattle; wild cherry, hackberry, wahoo, sassafras and wild grapes left by the birds; hickory nuts and walnuts buried by the squirrels; and acorns stored by the mice; they all germinate and take root and grow into seedlings, vines, shrubs, saplings and trees, which fill the fence-rows and overhang to form a sort of triumphal arch. And while all this is coming about, children play up and down, and grow up, and become lovers, and cattle come and go, and farmers drive up and down with their teams. And the trees become homes for birds; and the sod which long since has grown thick and luxurious has become the habitat of numerous small mammals, rarely seen, but whose existence is unmistakably in evidence to even the most casual observer. Here, now, for instance, is a heap of dirt the size of a peck measure, and over there is another. We will see several such piles as we walk along. They are formed by moles as they dig their underground tunnels, 12 to 18 inches beneath the sod. There are vertical shafts going down to these tunnels, and up these shafts the moles push the soil which has been loosened while constructing their dens and feeding grounds. They frequently construct tunnels near the surface, in yards and gardens and cultivated fields, by push-

ing the soil upwards with their powerful front feet, forming the surface ridges which are familiar to all of you. We will see several such surface ridges, with the tunnels only 2 or 3 inches deep, when we reach the orchard. Moles are easily caught when working near the surface. They are one of our most interesting small mammals, almost blind and deaf, but with highly developed senses of touch and smell. Their food consists mostly of fish-worms, and insects in both the larval and adult stages. They are voracious eaters, and if deprived of food for 24 hours they will probably have starved to death. Eating $\frac{3}{4}$ of their own weight daily is not unusual.

Two summers ago, Frank caught a mole and placed it in an apple crate which he had previously lined with sheet metal and half filled with moist dirt. The first day, he fed it several fishworms and June bugs; and early the next morning he started in again. On that day, however, we were having our family reunion, and every time a relative arrived Frank would show them his mole, giving it a nice juicy worm or a plump beetle for a demonstration. There were over 50 relatives present at the reunion, and after the last one was gone Frank found his mole dead, not starved to death but actually foundered. It had too much food without the usual active exercise of hunting. In a few days, he caught 4 more, placing them in the same box. This time he was unable to catch bugs fast enough, and the moles fought each other, and within two days they were all dead, this time starved to death.

We could spend hours, even days, along this lane, and then not have it explored. The temptation is to linger. We are left breathless by even the blue violets, hundreds of them, thousands of them, growing up through the sod,

peduncles eight, ten inches long, corollas an inch, an inch-and-a-half across; never before have you seen such violets growing wild and in such profusion. Maybe B_1 in the sod has worked its magic!

Now, here's the creek. I usually find it quite impossible to induce my friends any farther, on the first trip. You can see the orchard from here, or you could if it weren't for that old straw-stack half way up the slope.

To many folks, especially my city-minded friends, that old stack, rotting away, with its musty, mouldy smell, is a blotch on the landscape. One friend recently wondered why I didn't haul it away, since it marred such a delightful view just beyond. However, my good neighbor, Mr. Wilson, assured me it was worth a lot of money if I'd only use it to mulch my berries. If I'd tell you the story of that stack, in the beginning, perhaps it would fit more peacefully into the landscape. One sunny afternoon in the middle of June, three years ago, I stood at the edge of a wheat-field, 20 acres of wheat, 30 bushel-an-acre wheat was a conservative estimate. A gentle, moist south breeze sent ripple after ripple across the field. I will let a girl from Kansas tell you how I felt as I thrilled at the sight of the pulsating field:

"The sea is tumultuous always, lashing in fury at its confines, restless even in its quiet days. And the mountains are terrible with storm. But in the fields of wheat, when the wind takes them, there is peace. Slowly they move, ripple upon ripple . . . untroubled, without haste . . . The harvest will be . . . Here, the waves break against a fence, noiselessly as green surf might break in a dream . . . And the wheat flows endlessly, inevitably toward fruition." (Marion Ellet, in *Concordia, Kansas*, *Blade*.)

While standing there on that sunny afternoon, little did I suspect that the moist, south wind was also laden with rust spores from Texas, and that they were settling in hordes upon hordes amongst the wheat. Within three weeks, so rapid was the devastation, I realized that for once, at least, the wheat did not flow "endlessly, inevitably toward fruition." I recall a year or so ago, when Dr. McDonough and I were standing in this same place, I told him this story of how the South Wind had blown us that old, rusty straw-stack, and left our wheat bins empty.

Rarely, though, does that stack as it stands there now blocking out the view of the orchard, remind me of the recurrent futility of our endeavors; nor does it appear as a discordant note against the landscape; rather, I see ripple after ripple with the Kansas girl and good mulch for my berries with my farmer friend.

We must abruptly bring this field-trip to a close. In doing so, I want to say a personal word to each of you who have chosen biology as your major

endeavor. It would seem to me that you have chosen a field so eternally important that although you may never have to pay huge income taxes, still your dividends, though not measurable in dollars and cents, would yield you a satisfaction running into six figures. You remind me of the younger son in the story which might aptly be called "The Parable of the Thousand Hills." A very rich man, whose wealth consisted mostly in great herds of cattle, as wealth was measured in those days, called his two sons to him. "I am getting old," he told them, "and I must divide my riches between you." Turning to the elder son, as was the custom, he said, "Son, what will you have of my wealth?" to which the elder son replied, "Give me the cattle on a thousand hills." The father, who loved his younger son dearly, was very sad as he turned to him; for all there was left were a few small herds of goats and sheep, just bits of small change, as wealth was measured in those days. But the younger son, with the light of a great vision in his eyes, remarked simply, "Father, give me the thousand hills."



A Study on the Blood of the Chick Embryo

NATHAN BOGARD
(Epsilon)

It is agreed by almost all authorities that blood cells of the chick originate in the blood islands of the area vasculosa of the chick blastoderm. There peripheral angioblasts differentiate into the flattened endothelium, plasma is secreted and the central mass of angioblasts differentiate into the blood corpuscles. With these few facts there ceases to be a consensus of opinion and we find conflicting statements as to the origin of the various blood components.

The monophylitic theory holds that all blood strains, red and white, come from a common source and are only different morphologically. The polyphylic theory states that red cells are derived from one origin; while leucocytes and lymphocytes trace their origin to one or perhaps two other sources.

Sabin reveals that monocytes appear on the third day of incubation. Sugiyama states that monocytes do not appear during the first fifteen days of incubation.

Some authorities believe thrombocytes are descendants of lymphocytes; while others believe them to be of endothelial origin. However, the references found were all published before 1932, and perhaps work has been done recently to lead to a more universal and

concrete knowledge of the blood of the embryo.

The procedure used in obtaining blood in this study was to puncture the heart of the embryo and draw the blood into a 25 gage needle by means of a suction syringe. The blood was then expelled upon a glass slide and stained with Wright's.

Slides of second day, third day, and fifth day blood were prepared and then examined. The blood seemed to be fairly pure and the cells well stained. A number of the blood cells of the chick embryo were similar to those found in human bone marrow. Few corresponded to the blood cells of the adult fowl. It may therefore be assumed that these cells were passing through a process of morphological change.

Cells of the Second Day of Incubation

Malensek reported that large primordial cells with one to five nuclei are the source of all blood cells. During the second day of incubation the smears used contained a few cells answering this description. However, they were atypical and may have been due to foreign matter drawn into the blood.

The majority of cells found in the second day are megaloblasts which give

rise to the erythroblasts. These cells are found in various stages of mitosis, which is one method of increasing the first blood cells formed. The nuclei of these cells stain a purple-blue with Wright's; while the cytoplasmic material is of a pinkish-lavender color. The pinkish tint may be due to hemoglobin. Sugiyama believes this to be the reason. Some of the cells seem to have a granular content; while others appear of a more non-granular nature. Many of the cells had diffuse chromatin particles in the nuclei; while others were more condensed. This, however, may be due to the difference of the mitotic stages. There were no cells that could be called typical. This was attributed to the morphological changes through which the cells were passing.

Cells of the Third Day of Incubation

In the third day slides there were no evidences of any mitotic division. Two types of cells were present. Sabin reports that lymphocytes are distinct on the third day of incubation, which this author failed to find. One group of cells of the chick were similar to the nucleated human erythroblasts. The nucleus appeared as a network of chromatin with nucleoli scattered through the network. The cytoplasm was basophilic and the pinkish tint seemed to have disappeared. Whether this was due to the appearance of more basic material in the cytoplasm or to the loss of hemoglobin is difficult to determine. The cells mentioned above were also similar to the illustrations of the thrombocytes which Sugiyama reported on the third day.

The other type present were numerous cells that may well have been taken for mature erythrocytes; they were, however, larger in size. These were erythroblasts, whose cytoplasm stained a lavender-tinted pink suggesting the

presence of hemoglobin. The nucleus stained a dark purple and seemed to be without color in the center. The basophilic substance had greatly decreased.

Cells of the Fifth Day of Incubation

In the fifth day of incubation first evidences of acidiphilic staining were found. They were similar to the adult eosinophils and stained red, revealing the presence of round granules. The cells were spherical and seemed to have some basophilic particles present, probably the nucleus. The typical erythroblasts of the third day were still present; however, the nuclei of these cells appeared more granular.

Conclusion

This study revealed no new evidences as to the origin of blood cells in the chick embryo. However, the author found no monocytes or lymphocytes in the study and believes that Sugiyama was correct in assuming that none were present in the early days of incubation. The similarity of the chick blood to developing human blood coincided with the similarity of development in other embryological phases and points to a common evolutionary source.

The appearance of different types of blood cells each succeeding day of incubation show a decided morphological development before the adult cells appear. The author believes that supravital staining is the most effective way in the study of the embryo blood since changes can be observed more readily than by using Wright's stain.

The problem is interesting enough to warrant more work on embryo blood than seems to be going on at the present time.

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Our Appalling Ignorance

M. GRAHAM NETTING (Alpha Epsilon)

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Biology & Geography, University of Pittsburgh

Man, in one form or another, has existed for perhaps a million years; he has built cities for scarcely 6000 years; and he has engaged in scientific investigations, relatively untrammelled by traditions and prohibitions, for little more than 300 years. It is not surprising, therefore, that the majority of scientific lecturers and writers emphasize the great progress that has been made in this short period, and fail to mention the multitude of problems that await solution. Biology, at least, is now in a position similar to that of a railroad that has laboriously, but successfully, extended its main line across a vast and gloomy swamp. The railroad officials (administrators and publicists), soporiferously encomiastic, herald the completion of a great undertaking and stress its social implications. The passengers (the public that benefits from biological studies) ride over the smooth roadbed, listen to inaccurate stories of the difficulties of its construction, and gaze out over the swamp without realizing that the building of such a road, although it requires intimate knowledge of the conditions prevailing along the route traversed, does not require equal familiarity with the entire swamp. The train crews (applied biologists) are more interested in

learning whether or not the roadbed is sound enough to permit the immediate use of fast trains rather than in the details of its construction. The construction engineers and workmen (research biologists), who actually struggled with the swamp, know that they solved some of its mysteries along the right of way; some of them may dream of exploring its distant fastnesses, and might do so, except that other construction jobs, vital to the progress of the railroad, require their services. Across other swamps, rivers, and mountains the rails of scientific progress are constantly pushed forward, but there are always large tracts of unexplored territory left on either side of the main lines of progress; these must be investigated before the great trunk lines can be merged into one integrated network.

I have no wish to decry the accomplishments in any field of science, to repudiate our debt to the past, to lessen the homage paid to the great pioneers, nor to discredit the valuable services of those who present scientific knowledge in a form palatable for general consumption; but I do believe that we can spend too much time discussing these matters and too little pointing out unsolved problems. Every reader of scientific journals has encountered

numerous titles similar to these: "Fifty Years of Pithotomy at X University," "Reminiscences of a Pithotomist," or "Recent Advances in Pithotomy." But where does one find: "Pithotomy—a Neglected Science," or "The Stupidity of Pithotomists"?

Although my colleagues assure me that I can assert, without fear of being libelous, that numerous unsolved riddles exist in every subdivision of biology, it would, of course, be impolitic of me to intimate that any other branch can boast quite so many unanswered questions as herpetology. For this reason, and because of my sad familiarity with the vacuities in herpetological knowledge, I shall offer illustrations from this field, in proof of my claims of our appalling ignorance of many vital problems. The turbulent, ever-swelling flood of herpetological literature buffets many into believing that there is little that remains to be learned. Only the specialist, weary of saying to both technical and lay questioners, "That point has not been investigated," realizes how great a flood of descriptive words is needed to support each precious cargo vessel laden with facts; how many skinny epiphenomena, trailing streamers of documentation, must float downstream before one whopping-big, thoroughly-explained phenomenon heaves into view.

Herpetology in the United States has reached late-adolescence. We have almost completed the very necessary, but thankless, chore of describing and naming our native species; but, like the adolescent boy whose voice occasionally betrays him, we must revert frequently to the juvenile practice of describing and naming new forms. (Since I am a taxonomist I can label nomenclature and taxonomy as youthful stages in the development of natural

sciences without being accused of not comprehending their complexities or importance.) Our 25-foot (?) shelf of publications on North American herpetology may have to be centuplicated before we attain the maturity which will permit us to claim that we understand all phases of the biology of each species of our herpetofauna. The analogy of the present state of herpetological knowledge to an adolescent boy may be carried even further. The adolescent is able to recognize many members of the opposite sex, to call them by name, to recite their addresses, to list certain of their preferences in foods and activities, and to recount numerous examples of their contradictory behavior. He is not able, however, to chart their family trees, to detail their inter-relationships with other people, to relate their various backgrounds to their present characteristics, or to explain how their structure and function, about which his information is often inaccurate, affect their moods and actions. Lastly, and most pertinent to this discussion, he is so unconscious of the extent of his ignorance that he makes no attempt to investigate puzzling behavior (not susceptible of explanation on the basis of his limited knowledge and experience), but relegates it permanently to the category of female perverseness—just as many scientists pigeon-hole mysteries of animal behavior by labeling them "instincts."

Our tremendous ignorance of life histories has been rather effectively concealed by a once necessary, but now out-moded, technique. I refer to the practice of summarizing, in each and every regional report, the same old observations culled from the entire literature of each species. In an earlier period such assemblage of diverse and unrelated observations was necessary

to outline the behavior and activities of each species. At this time, readers often did not know whether a particular snake laid eggs or gave birth to living young, whether the snake fed upon rodents or displayed cannibalistic tendencies, and they cared not a whit that the testimony to oviparity came from a correspondent in Kansas and the proof of cannibalism from an observer in New York. Today we know that certain species are egg-laying at one altitude and live-bearing at another. We know that ophiophagy in New York does not necessarily imply similar food selection on the part of the same species elsewhere. An observation of the feeding of a salamander in a virgin spruce forest in West Virginia, and a record of the number of eggs deposited by the species in hardwood forest in Illinois, are as unrelated as the alternatives of the drunkard's question, "Is this Market Street or Wednesday?" Many amateur herpetologists, widely distributed throughout the country, are afflicted with the gnawing hunger of scientific curiosity. Instead of maintaining the fiction that composite life histories are worth the space they occupy we should point out to these amateurs that the entire life cycle of each species should be studied in each different habitat. Publication of a report on the breeding habits of the alligator in Louisiana should initiate similar inquiries throughout its range, for only through such comparative studies can we achieve a comprehensive knowledge of the species. Michigan snakes differ from those of the same species in West Virginia in size, in head shape, in habitat selection, in fertility, and in other respects; similar geographic gradients have been reported in other animals and for other regions, but the causative agents of such trends have not been established.

Probably no better case can be offered to demonstrate the extent of our ignorance than that of the feeding habits of the banded watersnake (*Natrix sipedon sipedon*). On the basis of scattered observations, fishermen have rather generally assumed that this snake is a serious enemy of game fish. Literally thousands of dollars have been spent by the editors of sportsmen's magazines in printing illustrated accounts of the culprits and their stomach contents. It cannot be disputed that watersnakes eat fish, but the scientist must ask himself what preferences in fish the snakes actually display: Are they scavengers that consume only dead trout found floating on the surface of the water, or do they actively pursue and engulf living specimens? Do they eat trout only when better-tasting fish (to a watersnake) are unavailable, or do they exhibit a man-like preference for trout, even when suckers are more plentiful? Do they consume so many predators of game fish or fish eggs that they may be permitted an occasional trout for dessert? In view of the long-continued and heated controversy over the feeding proclivities of the watersnake, it would seem that these questions should have been thoroughly investigated long ago. Actually, however, I know of only one extensive investigation of the feeding habits of the banded watersnake, and the results of this study have not yet been published in complete form. Furthermore, this study covered only one region, and the conclusions reached must be checked by equally careful work in other localities before it can be said that this snake is economically positive, or negative, throughout its far-flung range.

Since water is the sole beverage available for reptile consumption, the drinking habits of these animals should be easier to study than those of man.

Yet, in spite of the large numbers of turtles kept as pets, I have encountered only one observation on the water consumption of an American species. The daily water intake of two captive box turtles (*Terrapene carolina carolina*) was measured by Ruth B. Breder during a period of one week; in this time the female drank a total of 3 ounces of water and the male $1\frac{3}{8}$ ounces. Even less appears to be known about the drinking habits of American snakes, and the news that a $6\frac{1}{2}$ -foot indigo snake (*Drymarchon corais couperi*) in my laboratory rapidly imbibed a full quart of water, after a few days of deprivation, may astonish even herpetologists. If you think that we have been very lax in not accumulating information on the drinking habits of our charges, I recommend that you ask your local Audubon Society members to list the local birds that patronize bird baths in order to drink, those that use them for bathing only, and those that never make use of these facilities. During the ensuing argument you can sneak out, for no lists of this type have been published, and their preparation will require months of careful observation.

It is well known that many species of amphibians migrate to water in the spring for breeding purposes, but the stimuli that initiate these breeding migrations are accurately known for only a few of the several hundred North American species. The senses involved in the selection of situations for egg-laying have not been determined; some species of chorus frogs (*Pseudacris*) appear to prefer casual water for reasons completely unknown to us; toads are remarkably catholic in their tastes, depositing their eggs in a wide variety of aquatic situations; and the spotted salamander (*Ambystoma maculatum*) scorns the flooded pond-margins and

normally lays its eggs only in permanent water—a bit of discrimination as mystifying to us as it is important in the survival of the salamander. The calls of most of our frogs and toads have been described, and a few have been sound-tracked accidentally by moving picture companies on location, but records of them are not commercially available for teaching purposes. The intricate courtship patterns of some amphibians, and of a slightly larger number of reptiles, have been described; but much work remains to be done before we can explain the multitude of secondary sexual differences, in the light of the rôles that they play in complicated courtship behavior. As recently as this year, the first field observations of courting cottonmouths were described at a herpetological meeting, but we have yet to learn how the related, and far more widespread, copperhead “pitches a little woo.” Man finds sex recognition easy, because differentiating costumes are superimposed on his hide in childhood. It must also be admitted that visual stimuli are more important to him than they are to the male wood-frog. The latter must needs find his mate in the darkness of a cold March evening, and apparently recognizes his consort by the shape and firmness of the egg-filled body within his clasping arms. Because he depends on tactile stimuli so largely, the male wood-frog can be readily misled by the plumped-up body of another male, prepared by judicious injections of water. Largely as a result of investigations completed in the last ten years, we know that brilliant coloration and diverse ornamentation in many male reptiles serve the purpose, not of attracting females, but rather of enabling males to recognize others of their sex as competing suitors. This generalization is, however, based on careful observations of only a few of

the many species of reptiles in the United States.

There are many other broad lines of investigation that cry for study. What is the cold tolerance of amphibians and reptiles? What factors limit their altitudinal ranges? What methods for the control of poisonous snakes are effective, and in what instances should control measures be attempted? What are the daily activity periods of diurnal and nocturnal species, and how are these affected by meteorological conditions? In what manner do temperature and precipitation determine the dates of vernal appearance and autumnal disappearance of each species? What are the physiological differences between "deep" hibernation and "partial" hibernation? Does the same species vary in degree of hibernation geographically? Why do plethodontid salamanders almost universally indulge in so much "night life" by climbing to vantage points and exposing themselves for hours? Why do the individuals of some species live in communal fashion, while in others each male defends the little bit of territory his family "calls its own"? What rôle do autumnal migrations play in spring-breeding species? How fast can amphibians and reptiles travel? Which species are actively seeking more *lebensraum* and which are now "isolationists"? Although in this list I have called attention chiefly to blanks in our knowledge of natural history, I would not have you infer that our native amphibians and reptiles have yielded up all of their secrets upon the dissecting table, under the histologist's microscope, or in the physiologist's laboratory. Far from it! The definitive work on salamander anatomy, that of Francis, is descriptive of a salamander (*Salamandra*), belong to a family that does not occur in North America. Nonetheless, this work

must be accorded first place on the shelf of any anatomist who works with American salamanders, for no comparable study of any cisatlantic species has ever been written. The only dissecting manual for a North American snake is Kellicott's "The Dissection of the Ophidian," which, although brief and inadequately illustrated, is so much in demand that it was reproduced in facsimile in 1938.

In many instances we know far more about extremes than about norms, which is not surprising in view of the custom of many museums—in pre-statistical days—of saving only six specimens of a species from each locality. Widely scattered reports permit tabulation of the maximum lengths attained by the majority of our species, but our knowledge of the average sizes of males and females, or the minimum sizes at which they reach sexual maturity is fragmentary. Records of minimum, normal, and maximum weights are worse than fragmentary—they are virtually nonexistent. We know little about the longevity of amphibians and reptiles; less about age groups and normal life spans; and less still about the factors, degenerative or otherwise, that terminate their lives. We have some knowledge of growth curves, but we are just beginning to investigate the relative growth rates of head, trunk, tail, and limbs. I do not consider ignorance of some of these matters quite so shameful as others that I have mentioned, for even with abundant material readily available, human biologists have only recently begun to investigate some of the same problems.

To supplement the questions that I have posed I quote others from a little-known article, "Suggestions for the Study of the Natural History of Amphibians and Reptiles in Michigan."

This article was prepared by the late Frank N. Blanchard, one of the greatest students of amphibian and reptilian natural history in the annals of herpetology. Dr. Blanchard would certainly have provided us with answers to some of his own questions had not his premature death terminated a distinguished career. During his lifetime he virtually dedicated himself to the task of kindling the spark of investigative curiosity in others, and gave generously of his time in aiding those so inspired to complete their problems in worthy fashion. I believe it is only fitting, therefore, to pass on to another generation of students a few of the questions that stemmed from his fertile brain: "Why do the wood frogs and the swamp tree frogs start their choruses first and together, to be followed closely by the leopard frog and the spring peeper? Why does the tree frog wait until middle May to chorus; why does the cricket frog that emerges in April not breed until June? Why are the green frog and the bullfrog so late in laying their eggs? Why does the toad sing first at night and later by day? . . . Why is so little known about the habits of the tiger salamander, a species described over a hundred years ago? Who can now describe its mating behavior, its spermatophores, its spring emergence, its summer activities? . . . Why does the red-backed salamander, which is active early in the spring, wait until June to lay its eggs? . . . When and where do snakes lay their eggs? Information on this point was until recently almost a blank, and it is not much better now. Why do some snakes use communal nests? What causes the female to seek a certain place for laying and why does she leave it afterwards; or do some snakes remain with their eggs? . . . What is the function of the musk glands in the

base of the tail in snakes? These glands are possessed by both sexes but whether there is any difference in them between the two sexes is not known. The development and use of the senses in snakes is very imperfectly known. Snakes are supposed to be deaf. If this is so, to what extent is the loss of hearing compensated by ability to detect vibrations through the body? Snakes can see, but can they detect motionless objects? . . . The habits of our turtles have been even less studied than the habits of our amphibians and snakes. We know that they lay their eggs in the ground and in muskrat houses, but what are the differences in egg-laying habits between different species? The time and details of mating are not known. Do our species mate annually or only once in several years? When do the young hatch? Do they remain in the nest underground over the first winter, or is this true of only certain species? Why is it so difficult to find the very young turtles of most of the species? Can anything be learned as to their length of life?"

The questions about herpetology that we cannot answer are legion. I have listed only enough of them to indicate that our ignorance is, in movie parlance, "stupendous, colossal." Let us, therefore, put aside any fears of self-denigration, humbly confess our ignorance, and call upon all those that are interested, be they youths or non-agenarians, farmers or professors, to contribute their observations and ideas. There is nothing sacrosanct about herpetology. Men in all walks of life laid the rails upon which we roll forward today, and, if we are to complete our shining network before our building materials are placed on the priorities list of extinct animals, we must enlist the aid of every terrarium-lover, snake-handler, and turtle-fancier.

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A Tribute to Chaplain Keefe

(This tribute appeared in the Bull Sheet, published by 135th Medical "Bull Regiment," August 1, 1941.)

Chaplain Anselm M. Keefe received a telegram this morning announcing his appointment to the rank of Lieutenant Colonel. In his new rank, his primary duty will continue as it has always been in connection with the Army; as a Chaplain. No matter what rank a Chaplain may hold, his most important duty is as a Chaplain. This latest honor bestowed on Chaplain Keefe climaxes a series of appointments through the military ranks that began with his being appointed a Chaplain (Captain) in the Officers Reserve Corps on the 10th of January, 1924. In 1937, Chaplain Keefe was appointed a Major in the Reserve Corps. His appointment as Chaplain (Major) in the Wisconsin National Guard was made in February of 1939, and he was associated with the 135th Medical Regiment. His latest step along the road of advancement was made on the 30th of July, 1941, when he received official notification that he had been appointed a Lieutenant Colonel. His promotion will be acclaimed not only by the men of the 135th Medical Regiment, who know and respect him so well, but by all those even remotely connected with his work. His background is one that makes him well suited for his present work.

Colonel Keefe was born January 21, 1895 at Oconto, Wisconsin. His scholastic record which was culminated with



his work as a former Rector and Dean of St. Norbert College, West De Pere, Wisconsin, is a long list of achievements. He graduated from St. Norbert with an A.B. degree in 1916, and from St. Norbert Seminary in 1920. In 1923 he graduated from Catholic University of America, with an A.M. degree and from the University of Wisconsin in 1926 with a Ph.D. He was ordained a Priest in the Roman Catholic Church on September 18, 1920. From 1921-1923 he was K. of C. Chaplain at Fort Humphries (now Fort Belvoir), Virginia. At various times he has held posts of instruction at such schools as St. Paul's University Chapel, St. Norbert High School, Catholic University of America, University of Wisconsin, Marine Biological Laboratory and St. Norbert's College. Since December 1928 he has been Rector and Dean at St. Norbert's and relinquished his position only to take part when the Wisconsin National Guard was inducted into ac-

tive military service. The list of clubs and societies to which he belongs includes Botanical Society of America, Knights of Columbus, Phi Sigma, Gamma Alpha, Wisconsin Academy of Science, Arts, and Letters, Sigma Xi, Ecological Society of America, Reserve Officers Association, Catholic Educational Association, Alpha Phi Omega, U. S. Infantry Association and the Chaplains Association of the Army and Navy of the United States. He was editor of "The Biologist" from 1931 until 1940, and held executive posts in many of the fraternal and educational societies listed above. He is honored in print each year by having his biography printed in "American Men of Science" and in "Clergy Who's Who." Truly, he has thus far, lived an educational and interesting life, and as the man that nearly a thousand men turn to in time of need, his useful life will have many more happy chapters added to it.



Chapter News Letters

Beta

—University of Michigan

President—Reed W. Varner.

Vice-President—Boyd W. Walker.

Recording Secretary—Frances E. Wynne.

Corresponding Secretary—Harriet E. Smith.

Treasurer—Raoul L. Weisman.

Fifty-three new members were initiated into Beta chapter in 1941. 33 on January 29th and 20 on May 13th. Professor E. B. Mains, Director of the University Herbarium, spoke on "Photography in Biology" at the winter initiation. He illustrated his talk with excellent colored slides. At the spring initiation Dr. M. Titiev, of the Museum spoke about "The Uses of Snakes in the Hopi Indian Ceremonials." All new members were honored at a banquet held May 21st at the Michigan Union at which Beta chapter celebrated her silver anniversary. President Alexander G. Ruthven was the speaker at this banquet.

In addition to the regular meetings at which members heard interesting talks on various phases of Biology, Beta held two open meetings to which the general public was invited. The speakers at these were: Professor George R. LaRue, head of the Zoology department, who spoke on "Zoology's Unfinished Business" and Dr. Robert Gesell, who spoke on "A New Concept of the Synapse and its Application to Neural Physiology." These open meetings are held primarily to stimulate interest among undergraduates in biological fields and to point out exciting possibilities of research.

FRANCES E. WYNNE,
Recording Secretary.

Epsilon

—University of Denver

President—Loren J. Mickey.

Vice-President—Don Guthrie.

Secretary—Elizabeth Love.

Treasurer—Nathan Bogard.

The academic year of Epsilon Chapter was opened by an evening meeting, held October 15, at the home of Mrs. Frances Becker, faculty member. Nathan Bogard presented a pledge paper, "The Study of the Blood of the Embryo Chick," and Mr. David R. L. Duncan presented slides and an interesting discussion on "The Time of Ovulation." This included recent work done at Chicago, in which he participated. Mr. Duncan, who was unable to attend initiation last spring, was duly initiated as a faculty member at this meeting. Mrs. Becker served refreshments before the meeting adjourned.

The next meeting will be an open one for prospective members and interested persons. A luncheon meeting is also planned for this month (November), in addition to functions which are meant to introduce the fall pledges.

ELIZABETH LOVE, *Secretary.*

Zeta

—University of Wisconsin

President—Charles H. Winkler.

Vice-President—A. Irving Coombes.

Secretary—Lemuel A. Fraser.

Treasurer—R. M. Shackelford.

Piled in mountainous disorder about me on my desk lie copies of THE BIOLOGIST for the past two years, the secretary's minutes for as many meetings back as are available, and random notes on the more recent events in the active life of Zeta chapter! From this disorderly collection it is my new duty to write a segment of the modern history of our chapter—and carry on (or attempt to) in the fine manner of my

capable predecessor, A. Irving Coombes!

And now to ramble back over the last few months:

As a highlight of the spring activities we recall the Spring Banquet held on May 1st, with Dr. C. A. Elvehjem, nationally recognized authority on enzyme chemistry, as the principal speaker. Dr. Elvehjem stressed the "Importance of Methods in Biological Work," citing also the important part biochemistry is playing in the present national defense program. The "proper psychological mood" for the banquet was stimulated by wine which was served before the banquet in a separate hall; the diners were "lifted from the stupor of too much good food" in the singing of such biological songs as "The Sad Tale of a Youthful Sponge" and "Oh Chromosome!"

The new officers elected at a previous business meeting (April 10) were officially introduced:

President: Charles H. Winkler, Assistant in Zoology; from College Station, Texas.

Vice-President: A. Irving Coombes, Assistant in Biochemistry.

Recording Secretary: Lemuel A. Fraser, Teaching Assistant in Zoology; from Tacoma Park, District of Columbia.

Corresponding Secretary: Willard A. Van Engel, Teaching Assistant in Zoology; from Milwaukee, Wisconsin.

Treasurer: Max Shackelford, Assistant in Genetics; from Murray, Kentucky.

Editor: Melbourne R. Carriker, Research Assistant in Zoology; from Beachwood, New Jersey.

A record number of new members, twenty-five in all, were welcomed in the fraternity.

Gordon Lawrence Bender, in Economic Entomology; from Chippewa Falls, Wisconsin. Richard Henry Braun, Zoology; Superior, Wisconsin. Edward Junior Campau, Economic Entomology; Alto, Michigan. Grant Cotnam, Botany; Salt Lake City, Utah. Thomas Henry Flanigan, Zoology; Madison, Wisconsin. Donald Miller Goss, Soils; New Brunswick, New Jersey. Clifford William Hesselstine, Botany; Brighton, Iowa. Howard H. Hilleman, Zoology; Miles City, Montana.

Herbert Spencer Kupperman, Zoology; Madison, Wisconsin. Charles William Lines, Botany; DuBois, Pennsylvania. Willis Woodrow Mathews, Zoology; Tillamook, Oregon. John S. McFarlane, Plant Pathology and Genetics. R. L. Murphree, Genetics, Calhoun City, Mississippi. Warren E. Nye, Zoology; Loras College, Dubuque, Iowa. Howard Edwin Heggstad, Genetics, Madison, Wisconsin. Charles Gardner Shaw, Botany; Madison, Wisconsin. James H. Shaw, Biochemistry; Hamilton, Ontario. Frederick Madison Skelton, Dairy Industry; London, Canada. Dale Wilfred Smith, Agronomy; Madison, Wisconsin. Joseph John Tamulis, Biochemistry; Beloit, Wisconsin. Paul Chandos Trussell, Agricultural Bacteriology; Trail, British Columbia, Canada. Everett James Warwick, Genetics and Animal Husbandry; Aledo, Illinois. Joseph Arthur Weybrew, Botany; Wamego, Kansas. Joe Bransford Wilson, Agricultural Bacteriology; Dallas, Texas. Burl Winchester, Genetics; Waukomis, Oklahoma.

At the spring and fall meetings several outstanding men on the University of Wisconsin campus have been heard. On March 13th Dr. S. A. Wilde, Associate Professor of Soils discussed the interrelation of soils and forests in the Lake States. Then on March 27th, Dr. Wayne W. Umbreit, Instructor in Agricultural Bacteriology, directed his talk to the interesting subject of autotrophic bacteria.

Dr. Henry Guerlac's stimulating talk on "The Research Biologist and the History of Science" on October 9th started all members of Phi Sigma who heard him, thinking along new lines. Dr. Guerlac is chairman of the recently established History of Science Department in this University and in this capacity has much of vital interest to give to neophytic investigators. He defines the History of Science as "the effort on the part of people of various training to apply the method of the historian to the facts of science," and he would present the history of science in a systematized methodical way. The opportunity to do so is being granted him in a general course which he is teaching at this University. In this course he presents the general history of science from a historic approach. Dr. Guerlac believes that an organized

approach in which the minute details of the scientists' work is recorded is necessary. This enthusiastic scientist-historian would require more library work in all research. He pointed out that there exists a mass of so-called scientific literature which is not the true history of science. He briefly summarized his position as a worker in the history of science by saying that a person in his should be a clearing house for the literature of all scientific fields, should know the literature generally, and be able to aid investigators in a historic investigation of their fields.

At our meeting on October 23rd, Dr. Arthur Koehler of the U. S. Forest Products Laboratory, Madison, Wisconsin, showed in his illustrated talk what significant work has resulted from the study of annual ring patterns of woods. Wood Technologist Dr. Koehler has conducted research on wood structure with the U. S. Forest Service since 1911, and since 1927 has been chief of the Division of Silvicultural Relations. By the aid of slides he traced the microscopic nature of annual rings, showing the variation in the ring pattern of different trees, difference in spring and summer growths, etc. He pointed out that variation in rings is due to soil moisture fluctuations, in turn dependent on rainfall. The applications of this study which he mentioned are most interesting: He told of determining the age of the giant Sequoias of the West Coast; of tracing the time of construction of cliff dwellings in the South West by constructing calendars of annual rings in trees; of dating fires in forests by scars left in the tree wood; of matching woods in legal evidence; and of establishing the date of blaze marks on old trees used by surveyors in their earlier work.

Zeta chapter has been giving honorable mention annually to that outstanding Senior undergraduate in Biology. On March 13th the Phi Sigma faculty committee making this selection was elected: they were Dr. William B. Sarles, Dr. E. M. Gilbert, Dr. Lowell E. Noland, Robert O. Stafford was awarded the honor. His name was listed with those of other recipients of honors on Parents Week-end.

President Winkler reminded Zeta chapter on the October 9th meeting that in May of 1942 this chapter will

be celebrating its twenty-fifth anniversary. The chapter is planning an appropriate celebration for this significant occasion.

This fall the chapter has introduced a short period of group singing at the opening of each meeting. As a start five sheets of songs have been assembled, many of the songs being introduced by Eugene Elliott, a newcomer in Botany at this University from our sister chapter of Lambda in Montana State University. Eugene conducted the singing at the first meeting, and did well in partially overcoming some of the inertia gathered through the years in the absence of singing in the chapter.

MELBOURNE R. CARRIKER, *Editor*.

Eta

—Michigan State College

President—George Anastos.

Vice-President—G. Richard Weaver.

Secretary and Treasurer—Robert Glasgow.

Kappa

—University of Kansas

President—Frank V. Kalich.

Vice-President—Ronald McGregor.

Secretary—Florence E. Dill.

Treasurer—Dorothydean Viets.

Lambda

—Montana State University

President—Alan Bond.

Vice-President—Hazel Hayden.

Secretary—Vivian Medlin.

Treasurer—Merle Rognrud.

Since last spring much water has flown under the bridge and much has been accomplished by members of Lambda chapter of Phi Sigma. Students have gone to other institutions, professors have been active in research and the chapter is more active than ever.

Former student members are literally scattered from coast to coast. John Timm, who received an assistantship, is continuing postgraduate work in Botany at the Rochester Forest School. John Wigenstein is at the Harvard

Medical School and likes it very much; Aloha Hannah is now at the University of Oklahoma; while Richard Paulson and George Fritz are continuing their education at the University of California. René Blondeau and Eugene Elliott have elected the University of Wisconsin as the place to continue their schooling while Iowa State College is the choice of former Lambda prexy, Allen Chesbro. Jean Keebsbach is now at the Los Angeles County Hospital while Stanley Ames is at Columbia University working towards his doctor's degree in Physiological Chemistry.

Faculty members of Lambda chapter have been very active this summer in various fields of research ranging from rats to a phytochemical study of the *Artemesia*.

Dr. George Finlay Simmons resigned the presidency of Montana State University, but is still on the faculty as a Professor in Zoology.

Dr. J. W. Severy tendered his resignation as vice-president of the university but is still chairman of the Division of Biological Science. Dr. Severy is also the chairman of the Montana State Fish and Game Commission, a post for which he is admirably suited.

Dean Spaulding of the Forest School is the head of the committee for the correlation and utilization of the WPA activities on the campus.

Dean Mollett of the School of Pharmacy has continued his research on insecticidal bearing drugs. He is also actively engaged in research of *Hyalomys niger* and last summer perfected a new technique for the assay and extraction of a fixed oil from the plant.

Dr. Suchy, also of the School of Pharmacy is beginning a phyto-chemical study of the *Artemesias* of Montana and hopes to test some of the extracts and determine any of their possible insecticidal value in combating various garden and orchard pests.

Dr. Browman of the Zoology Department has received \$500.00 from the National Research Council for the continuance of his studies of the effects of various light conditions upon the reproductive and activity behavior in the white rat.

In order to continue his study of the physiology of the weasel, their molt

and their reproductive cycle, Dr. Wright of the Zoology Department has received \$150.00 from the Elizabeth Thompson Science Fund and a like sum from the National Research Council.

The past summer was spent by Dr. Fred Barkley in touring Arizona and Old Mexico. He has also received a grant-in-aid from the American Philosophical Society to continue his studies of the plant family, *Anacardiaceae*.

Employed by the United States Geological Survey, Dr. Deiss of the Geology Department spent the summer mapping the Sepu Quadrangle in Northern Idaho.

Professor Melvin Morris of the Forestry School continued his work at the University of Chicago in Plant Ecology and Plant Physiology towards his Doctor's degree.

Organic synthetic problems and their medicinal values are the current research interests of Dr. Howard of the Chemistry Department. Besides carrying on his research, Dr. Howard also taught summer school at Montana State University.

Dr. Waters of the Forestry School is continuing his research on the mycorrhiza and water relationship in the establishment and survival of Ponderosa pine in the windbreaks and shelterbelts of Eastern and Central Montana. He is also carrying on studies on the possibility of employing the "mercury vapor" lamp in detecting early stages of decay in wood.

Professor Ramskill, also of the Forestry School, is engaged in the study of climate as a factor in the development of tissue in the needles of Ponderosa pine. Professor Ramskill, thru a statistical study, has determined that the coefficient of correlation between climate and the amount of protective tissue is very high, up to 8. He has also worked out a numerical climatic index of each locality studied as based upon a microscopical study of the pine leaves of that locality.

Passing from research and last summer's activities, to those of this fall, Lambda is already in the thick of things. On October 31st, Lambda was the guest of the Bozeman chapter at a luncheon given on the occasion of the Montana Academy of Science meeting

at Bozeman. Of the 35 persons present at the banquet, 9 were from the Missoula chapter.

Dr. Trueman from the Northern Montana College at Havre, Montana presented to the Academy, an alumnus of the Wisconsin chapter. Of the papers delivered at the meeting, several were from members of this chapter.

Retiring president of the Academy was Dr. Gordon Castle of Lambda. Members of this chapter who were elected to offices in the Academy are retiring secretary Dr. Fred Barkley, who was elected vice-president and editor and retiring vice-president of the Biological Section, Professor Melvin Morris, secretary. Several chapter members made speeches at the meeting.

Last spring quarter, 16 new members were elected to the Lambda chapter. They were: Catherine Ambrose, Russell K. Anderson, Martin C. Edie, Jorgen E. Egeland, Lois L. McCollum, Lois G. Murphy, Wilbert O. Murphy, Joseph D. Peters, Helen V. L. Peterson Mary E. Pollock, Jack E. Schmautz, Conda E. Sloat, Mary E. Thornton, Edward S. Murphy, William E. Schreiber and Dr. Joseph W. Howard.

This quarter 24 members were elected and are: Arthur Beattie, Wayne Jones,

Albert Picchioni, Carleen Heinrich, Arthur DeBoer, John Lotka, Roland Bagganostoss, Warren Bradeen, Clemence Crouch, Robert Green, Teresina Pateno, Everett Sanderson, Arnold Bakken, Rodney Miller, Ruth Hogan; and Dr. A. A. Steinhaus, of Hamilton; Mrs. Alva Fatzer, Home Economics; Mr. C. F. Hertler, Physical Education; Dr. C. L. Bourdeau, Missoula; Mr. M. V. Walker, Glacier National Park; Rev. J. F. Cronin, Carroll College, Helena; Dr. L. L. Sloss, School of Mines, Butte; Dr. S. M. Trenouth, of Missoula; and Dr. Ludvig Browman of the Zoology Department.

Initiation of the new members will take place at Hamilton, Montana. The order of the day will be first a tour of the Public Health Laboratories at Hamilton followed by the formal initiation of the members. Following the initiation will be a banquet at which the principal speaker will be Mr. Walker, Naturalist of Glacier National Park. The banquet will be topped off with entertainment of various kinds.

Allen Bond, president of Lambda, was elected delegate, and Vivian Medlin, secretary of Lambda, alternate to the national meeting.

J. E. SCHMAUTZ,
Editor of Newsletters.



Mu

—University of California

President—Jack R. Harlan.

Vice-President—I. L. Sheckmeister.

Secretary—James W. Hansen.

Treasurer—Irena Heindl.

Rats became very interesting creatures and possessed intelligence after Dr. R. C. Tryon, of the Psychology Department discussed "The Inheritance of Maze Intelligence in Rats" at the March 19th meeting. The ability of a rat to thread a familiar maze without errors is not based on sight, sound, or olfactory memories but apparently on some special sense which is inheritable. Dr. Tryon and his colleagues have succeeded in breeding a "dumb" and a "smart" population of rats, based on errors in traveling a maze, and by crossbreeding these two are attempting to discover the exact genetic relationship involved.

For the April 7th meeting Dr. A. S. Foster, of the Botany Department discussed recent studies on Meristematic tissue. Elections were held for new members and officers. The new officers are: Jack R. Harlan, President, Isaac L. Sheckmeister, Vice-President, James W. Hansen, Secretary, and Irena Heindl, Treasurer.

The initiation banquet was held April 28. Twenty-seven new members were initiated, making a total membership for Mu chapter of 1014. Dr. Bond of the U. S. D. A. Soil Conservation Service made many interesting remarks about the effect of the new soil conservation program on wild life.

The chapter has departed slightly from the usual procedure by scheduling three open houses. The first and second of these have already been held at the Museum of Vertebrate Zoology and the Radiation Laboratories, respectively. The third is to be held at the Museum of Anthropology. The museum contains one of the largest bird and mammal collections in the country. Unique and interesting specimens from all over the world can be found here. One entire room contains nothing but furs. Some of them are rare and very valuable.

Following a discussion of the theory, mechanism and the applications of the

radiation laboratory we were given an opportunity to inspect the 60-inch cyclotron. Our kind hosts turned it on and split a few atoms for us. The souvenir hunters were disappointed because the fragments were too small to find.

The speakers and their subjects for the three public lectures were as follows: Dr. Ralph W. Chaney, Professor of Palaeontology, "The Ancient History of California Forests"; R. C. Miller, Director of the California Academy of Sciences, "An Introduction to Human Knowledge Based on the Shipworm"; Chauncey D. Leake, Professor of Pharmacology, "Science and Horseracing."

JAMES W. HANSEN, *Secretary*.

Nu

—Washington and Jefferson College

President—Ray Elliott.

Vice-President—Alvin Bales.

Secretary—James Ebert.

Treasurer—T. W. Morgan.

Nu chapter of Phi Sigma is beginning her twentieth active year at Washington and Jefferson College. The officers for the year 1941-42 are: President, R. S. Elliott; Vice-President, A. Bales; Secretary, J. D. Ebert; Treasurer, T. W. Morgan.

Fourteen men have been pledged to Nu chapter and will now undergo a period of training and watchful guidance before they are formally initiated next spring. This marks the beginning of a new system in our chapter—a system which we believe will prove highly successful. Each pledge must maintain his high scholarship, and show research merit before he is initiated. The men pledged are: J. Arthur, W. Blakemore, F. Close, R. Cunningham, G. Hughes, A. Magness, K. McCullough, W. McNamara, E. Miller, J. Paull, W. Patterson, R. Swenson, J. Thompson, R. Thompson.

Nu chapter this year plans an elaborate program leading up to our twentieth anniversary celebration in April. Tentative plans indicate this will be the most active year Nu chapter has seen in recent years.

We opened our program on October 15th, by sponsoring an open house at

McIlvaine Hall for pre-medical students of the college. The principal speaker was Dr. L. D. Sargent, an eminent physician and cardiologist, who spoke on the subject, "What it means to be a doctor." Over thirty-five men were present, and following the speech, engaged in an open discussion on pre-medical work.

Nu chapter looks forward to a happy and prosperous year of fellowship and service in Phi Sigma.

JAMES D. EBERT, *Secretary*.

Pi

—Emory University

President—Carolyn Forman.

Vice-President—Charles Jennings.

Secretary—George Sciple.

Treasurer—Joseph Broek.

Rho

—University of Illinois

President—Robert I. Wise.

Vice-President—Mary J. Cox.

Secretary—Ralph D. Lowell.

Treasurer—Garland T. Riegel.

Sigma

—University of Florida

President—Dr. H. H. Hobbs.

Vice-President—J. C. Dickinson.

Secretary—Mrs. Yvonne T. Brannon.

Treasurer—R. O. Thomas.

Sigma chapter has resumed its activities for the year 1941-42 with a first business meeting on September 29th.

The activities of the chapter for the present year will consist mainly in informal lectures given by speakers from different fields of scientific work. The initiation banquet and a possible excursion to the caves in the vicinity of Gainesville (Fla.) will feature the "social" events of the year.

On October 20th, Dr. James Speed Rogers, of the University of Florida and a member of Phi Sigma, offered the first lecture for our chapter. His last year of teaching at the University of Toronto (Canada), on an exchange professorship with Prof. W. J. K. Harkness, furnished Dr. Rogers with the material for his talk. "Some observa-

tions on the training of biologists in Canada." Although anecdotic, the lecture was very informative and enabled the listeners to appreciate some of the methods in research technique which are somewhat different from those familiar to graduate students in the United States universities.

YVONNE BRANNON, *Secretary*.

Tau

—Duke University

President—A. Bascom Hardcastle.

Vice-President—James B. Krause.

Secretary—Marjorie Stallcup.

Treasurer—Dan T. Watts.

Upsilon

—Miami University

President—John Hamsher.

Vice-President—James Canright.

Recording Secretary—Marjorie Jacoby.

Corresponding Secretary—Harley

Brown.

Treasurer—William Klein.

Phi

—University of New Hampshire

President—Eleanor Sheehan.

Vice-President—Richard Stroud.

Secretary—Barbara Ames.

Treasurer—Chesley Hall.

Chi

—Montana State College

President—Eleanor Bliler.

Vice-President—Not yet elected.

Secretary—Anita McGuire.

Treasurer—Shirley Johnson.

Omega

—University of Oklahoma

President—Wayne Randel.

Vice-President—Ed Dale.

Secretary—Scotty Kinnan.

Treasurer—Elizabeth Trent.

At a candle-light service in the Biology building, April 3, 1941, the following officers were installed:

President—Wayne Randel, Ponca City.

Vice-President—Ed. Dale, Norman.
 Secretary—Scotty Kinnan, Tulsa.
 Treasurer—Elizabeth Trent, Waco,

Texas.

The six initiates: Stanley Childers, Leon Combs, Katie B. Gay, Robert Dixon, Anna B. Fisher, Henry W. Hooper, were installed at an informal buffet-supper at the Faculty Club of the University.

The Phi Sigma medal for scholarship, leadership, and outstanding achievements went, this year, to Frances De Vorse of Norman.

An ecological discussion of Yosemite National Park by Professor A. D. Buck of Tonkawah Junior College opened the fall program. October 24th, the prospective members were entertained at a square dance in the City Park Lodge. At the November meeting, Hugh Davis, Curator of the Mohawk Park Zoo in Tulsa, will speak on wild animals of the world, and show color films on the methods of collection. Dr. J. K. G. Silvey of the State Teacher's College in Denton, Texas, will speak at the fall initiation banquet, and the semester's activities will be closed by a group of research papers, and a discussion of the A. A. A. S. meeting.

SCOTTY KINNAN, *Secretary*.

Alpha Alpha

—University of Southern California

President—Fenton L. Feenay.
Vice-President—Elaine Adams.
Secretary—Mrs. Lyna Y. Phillips.
Treasurer—Arnold Von Der Lohe.

Alpha Beta

—Mount Union College

President—Walter Wichern.
Vice-President—Austin Hammond.
Corresponding Secretary—Mary Colette Lins.
Treasurer—Robert Hirst.

Alpha Epsilon

—University of Pittsburgh

President—M. Graham Netting.
Vice-President—Helen Worthing.
Recording Secretary—Peggy Laschinger.

Corresponding Secretary—Albert G. Smith.

Treasurer—Maryon Dytche.

Dr. Edna Higbee, former corresponding secretary of the chapter, has been acting editor of THE BIOLOGIST since last spring. The chapter is honored at having one of its members chosen for this position.

Mr. Harry Roslund, elected Vice-President of the chapter last spring, was forced to resign this office so that he could take over his duties as chemist at the Lindy Oxygen Company.

Dr. Walter Sweadner has returned to the campus as associate curator of Entomology at Carnegie Museum as well as assistant professor of Biology at the University. Dr. Sweadner has been professor of Biology at the Erie Center of the University for the past several years.

Dr. Daniel A. Busch of the Department of Geology was a member of the Carnegie Museum expedition into Utah this past summer. Dr. Busch made an interesting collection of fossils and geological specimens.

Dr. William Emig, Associate Professor of Biology, has recently published his long expected book "Stains and Stain Technique." Dr. Emig, an honorary member of this chapter, is a well-known authority on cytology and the preparation of cytological material.

Dr. Lee Truman has filled the vacancy at Erie Center created by Dr. Sweadner's return to the campus. Dr. Truman was formerly an assistant on the campus.

Dr. Olga Catizone is now assistant professor of Biology at Mary Grove College in Detroit, Michigan. Dr. Catizone was an assistant and former treasurer of the chapter.

Mr. Richard Darsie and Robert Williamson are now engaged in active defense work in the Medical Corps of the United States Army. Formerly assistants in the department, Mr. Williamson is stationed in Louisiana, and Mr. Darsie is in Texas.

Members of the chapter to receive graduate degrees either at the June or August commencements, were: *Doctor of Philosophy*, Miss Olga Catizone, Mr. William A. Harris, Mr. Lee Truman, Mr. Theodore McMillion, Mr. James B. Finn; *Master of Science*, Mr. Charles B.

Wurtz, Mr. LeRoy K. Black, and Mr. Albert G. Smith.

Mr. William Sulzbacher has received an appointment as naval architect in chemistry, and has taken up his duties at the Philadelphia Navy Yard.

Dr. Samuel H. Williams, Professor of Biology, has been granted a year's leave of absence from his duties at the University.

Miss Annabelle Broomall (now Mrs. Richard Horn) has returned to the campus to finish her requirements, for a doctorate of philosophy. Miss Broomall has been an instructor in Biology at Lake Erie College, Paynesville, Ohio.

Mr. William Charlesworth has left his position at Phipps Conservatory to become professor of Biology at Beaver High School, Beaver, Penna.

Mr. Kenneth Bergstresser, former professor of Biology at Beaver College, Jenkinstown, Pennsylvania, is now director of the Kaye House in Pittsburgh.

Mr. M. Graham Netting, president of Alpha Epsilon, has been elected delegate to the Christmas meetings at Dallas, Texas.

ALBERT G. SMITH,
Corresponding Secretary.

Alpha Eta

—Oklahoma Agricultural and Mechanical College

President—Wayne Jackson.

Vice-President—Lon McGilliard.

Secretary—Mary Francis Cromwell.

Treasurer—J. C. Garrett.

Alpha Iota

—Bucknell University

President—Walter Freyberger.

Vice-President—Robert Kraut.

Secretary—Girmaine Roskon.

Treasurer—Evelyn Homewood.

Alpha Kappa

—Hunter College

President—Anita Zoroli.

Vice-President—Shirley Dushkind.

Secretary—Helen Kalinsky.

Treasurer—Mrs. Sylvia Needleman.

Alpha Lambda

—University of Utah

President—Lewis Nielsen.

Vice-President—Wallace Bradley.

Secretary—Patricia Dougall.

Treasurer—Irving McNulty.

Alpha Lambda chapter began the current year with the election of a new president to fill a vacancy caused by the resignation of Alvin T. Bleak, who has accepted a position with the Forestry Service in Ogden, Utah. Chosen to fill his place was Lewis Nielsen, a former secretary of the chapter.

At the same meeting, plans were made for a series of educational programs to be given twice a month at regular dates. It was decided that reports on individual research by members of the society would be alternated with talks delivered by eminent outside authorities at the gatherings.

A delegate and an alternate were selected to represent our group at the National Convention.

With this start we hope Alpha Lambda will enjoy a progressive year.

PATRICIA DOUGALL, *Secretary.*

Alpha Mu

—University and State College of Oregon

President—Robert Mace.

Vice-President—Dr. Elmo Stevenson.

Secretary—Clara Budlong.

Treasurer—Ernest Anderson.

Alpha Mu plans to have a series of panel discussions on Biology and War. These will be under the leadership of three well versed faculty members and three students, with a general discussion following in which members in the audience may participate. We are varying this theme twice during the year because we have two excellent sets of pictures we wish Alpha Mu members to see.

Dr. Kenneth L. Gordon will show pictures of bird and animal life of Eastern Oregon at our October meeting. November will bring our first panel on *Eugenic Effects of the Present War and Defense Activities*. December is the month for our fall initiation banquet. We have selected as the possible

subject, *Bacteria in Today's War*. Another panel on the *Biological Effects of Chemical Warfare* will be presented in January. Our second series of pictures will come in February when Dr. Lawrence will show colored botany slides. March gives us the opportunity to invite discussion on the *Effects of War on Biological Research*, and we will sponsor the last panel in April when *War and Wildlife* will be brought before us. The remaining meeting will be the spring initiation banquet at which *Psychological Effects of War and Defense* will be the main topic.

We believe we have planned a series of programs that will be worthwhile not only to a small minority of people, but that will be wide enough in scope to demand attention and discussion by many.

CLARA BUDLONG YOUNG, *Secretary*.

Alpha Nu

—University of New Mexico

President—Frederick Worman.

Vice-President—Maurice Thompson.

Secretary—Wallace Lloyd.

Treasurer—George Prothro.

Alpha Xi

—Rhode Island State College

President—Donald Johnstone.

Vice-President—Ruth Hannah.

Secretary—Mary D'arch.

Treasurer—Lester Friedman.

Alpha Omicron

—Marquette University

President—Robert E. Esser.

Vice-President—Joseph Fillan.

Recording Secretary—Joseph J.

Wocasek.

Corresponding Secretary—Marjorie Michaelis.

Alpha Pi

—University of Colorado

President—Margaret Kelsall.

Vice-President—

Secretary—Catherine Brown.

Treasurer—Earl Flanagan.



New Books

Except for the signed Reviews, the thumbnail sketches of current biological literature appearing in this section are not meant to be exhaustive or deeply critical. They aim to survey the rapidly growing field of biology. Naturally these reviews represent the candid opinions of various readers not necessarily those of the National Council, nor even those of the editor.

FOUNDATIONS OF BIOLOGY, Sixth Edition, by LORANDE LOSS WOODRUFF. *The Macmillan Company, XVII plus 773 pp., 469 figs., \$3.75.*

There are many textbooks available as introductions to the field of biology. Of them, one of the best known has been Woodruff's "Foundations of Biology" which now appears in the sixth edition. Always a textbook of first class, soundly conceived and well executed, this book has summarized the field of biology in such a way that any student is able to form a comprehensive idea of the entire subject. The sixth edition is thoroughly revised and the contents brought up to date, changes and additions having been made in all the chapters of the book. There is also a new chapter on human ancestry which presents the anthropological background of man. Changes in the order of presentation of certain subjects have been necessitated, but the book still conforms to the statement made in the preface to the first edition, that it "brings together in brief form the fundamental principles of biology for the college student and the general reader." Its excellence is so well recognized that it seems unnecessary to make any extended comments regarding it.

A. RICHARDS.

PRINCIPLES OF ANIMAL BIOLOGY, Fifth Edition, by A. FRANKLIN SHULL. *McGraw-Hill Book Company, XIV plus 417 pp., 296 figs., \$3.50.*

There is no method of teaching college zoology which is correct as contrasted with others which are incorrect. In use in first class institutions of America by teachers who are thoroughly competent and scientific are books based primarily on the systematic and evolutionary, a phylogenetic approach to the animal kingdom, others which

minimize classification and stress principles and function almost to the exclusion of phylogeny, and still others which represent all degrees of compromise between the two. There are also others which represent the economic point of view, and the principle of integration of topics discussed with the student's early problems of life, the unit plan. The reviewer is reminded of a sage bit of counsel given him years ago that "with a particular teacher and a particular group of students such and such a method would be best, but if any were changed another method might become more advisable." Certainly books of all possible types are now available for every combination of teacher and students. The fifth edition of Shull's **PRINCIPLES OF ANIMAL BIOLOGY** (McGraw-Hill, 1941, New York and London) is a revision of a thoroughly standard and well thought of text which emphasizes function and develops principles of biology of general interest to all students. In view of the past success of the book it seems useless to review it in detail, other than to say that it has been brought up to date and changes have been made so as to make more use of those recent advances of chemistry which are applicable to biology. Its continued usefulness may be confidently predicted.

A. RICHARDS.

GENETICS AND THE ORIGIN OF SPECIES by THEODOSIUS DOBZHANSKY, 2nd Edition, Revised. *pp. XVIII + 446. Price \$4.25. Columbia University Press. September 1941.*

A stimulating book for students who have an elementary knowledge of Genetics and Evolution. The suggestions given on some of the unsolved problems in fields related to population

genetics, will aid embryo research workers in actively carrying on their problems. In other cases it will present ideas to students interested in these fields, but unable to decide on a particular phase of the work.

Students who are familiar with the first edition have found the additional facts presented in the second edition of great use to them in preparing reports for class presentation. The treatment of the genetic basis of species and of genetics as it applies to the problem of evolution is so well organized, and contains so many interesting facts, that one's attention is directed toward statements that might otherwise be overlooked. It is a book to be kept available for frequent consultations by students and research workers in the field of genetics and evolution.

E. HIGBEE.

NATURAL HISTORY AND THE AMERICAN MIND by WILLIAM MARTIN SMALLWOOD. pp. XV+445, illus. Price \$4.25. Columbia University Press.

A history of early American naturalists, who as explorers were to a certain degree, creating the scientific method of analysis but not of the kind that is spoken of today as "science." The people were intrigued by every new animal and plant they encountered. The descriptions of their experiences and reactions as given in the discussion of early writings, carry the reader back and over the routes traversed by the men selected by the author, as representative of the times which he is describing.

The effect of Europe on the natural history in America is interestingly presented with accounts of the influence of great teachers, of fellowships and exhibitions of rapidly developing societies, museums, as well as the correspondence between American students of nature and the scientists of Scotland, England, and some of the Continental Countries.

This work could well be used by students interested in the history of Biology, because in reading the book they will find an excellent contribution to their material on American culture, which gives the beginnings of the discrete disciplines or sciences of geology, biology, botany, and zoology. The il-

lustrations represent the results of observations of these early American naturalists, and the American mind.

An excellent book to be classed with some of our more famous works on the history of biology. E. HIGBEE.

STUDIES IN EXPERIMENTAL ZOOLOGY (Regeneration, Experimental Embryology, Endocrinology) by A. ELIZABETH ADAMS, PH.D., *Mount Holyoke College, Second Edition. Edwards Brothers, Ann Arbor, 1941. x—89 pp., \$1.25.*

During the present century an extensive literature has developed to record the many kinds of experiments made upon animals both young and adult. In biological research we have clearly entered the period of experimentation. There has as yet been no generally accepted formulation of these results for presentation to classes of even advanced students. But Dr. Adams, in 1936, published in mimeograph form a series of studies designed "to give students an idea of the experimental method and to train them in carrying through an experiment," and to give them a variety of simply done experiments and furnish material to illustrate regeneration, experimental embryology, and endocrinology. The second edition of this work (1941) adds texture material and brings the reference lists more nearly up to date.

The three main divisions include a rather miscellaneous list of experiments which have of themselves little continuity and do not in any sense cover the fields of which they are examples. The justification for their selection lies in the purpose to teach methodology of experimentation and to introduce the student to work already done on representative problems. The selection of material is a satisfactory one for beginners in experimental research. Doubtless any other teacher giving a similar course would choose somewhat different material, but a student who would work through many of the experiments here given would be in a position to pursue effectively further studies. It may be noted that the experimental procedures are not very complicated and do not require a great deal of apparatus. The author stresses the importance of knowledge of the normal first, then of

careful analysis, and proper experimental procedures. Then a laboratory report of the experiment either in synoptic fashion or fully written is required to be prepared in the form of a standard scientific paper; introductory statement of problem, materials and methods, results, discussion, summary and conclusion and reference lists. All this is in accord with recognized scientific procedure and is entirely commendable.

A. RICHARDS.

BIOLOGICAL ASPECTS OF INFECTIOUS DISEASE by F. M. BURNET, M.D. *x plus 310 pp. The Macmillan Company; Cambridge, England: At the University Press. \$3.75.*

Dr. Burnet has condensed in the 310 pages of this book a most comprehensive account of the biological aspects

of infection. Parts one, two and three give a simple and interesting treatment of the ecology and evolution of infection, the organisms involved, and the defense mechanism of the host. Part four deals with the methods of transfer of infection, animal reservoirs, and the general characteristics of epidemics. In part five several of the more important infectious diseases are discussed. Part six is an epilogue treating the relations of such factors as war to infectious diseases. The possibility of the use of disease in war and how to combat such a measure are thoughtfully treated.

The book was written in simple language and it will be a useful book to both the laymen and the biologist.

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Date.....

To MR. E. H. STEWART,
Treasurer of Phi Sigma,
Mesa, Colorado.

Dear Mr. Stewart:

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The Duties Of The Chapter Secretary

To the National Secretary:

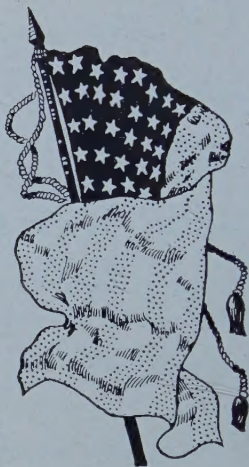
1. At the beginning of each school year furnish the names *and* addresses of chapter officers.
2. Order all chapter supplies well in advance of time needed.
3. Order certificates at least two weeks before initiation date.
4. Send initiation fees and membership record blanks at time certificates are ordered.
5. Be sure that copies of THE BIOLOGIST are received by *all* members including faculty and honorary members.

To the National Treasurer:

1. Furnish a correct list of chapter officers and addresses.
2. Inform the national treasurer at least a month in advance of the correct number of BIOLOGISTS needed for all your members.
3. Report name, serial number and date of initiation of each initiate at time certificates are ordered.

To the Editor:

1. Furnish a correct list of chapter officers and addresses.
2. Send chapter news letters for BIOLOGIST at least four weeks in advance of publication.
3. Send in copies of outstanding biological lectures or addresses (not however research reports) delivered at your institution.
4. Send in helpful suggestions or constructive criticisms concerning THE BIOLOGIST.



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